

# **Combined Heat and Power (Cogeneration)**

## **ENERGY STAR<sup>®</sup> Award and CHP Certificate of Recognition**

The United States Environmental Protection Agency (EPA) and the Department of Energy (DOE) are proud to announce a new award to recognize cost-effective, state-of-the-art energy conversion facilities. In particular, the award will promote combined heat and power (CHP) projects that reflect leadership in helping to achieve the national goal of doubling CHP capacity by 2010.

The **ENERGY STAR<sup>®</sup> CHP Award** is reserved for projects with a minimum of 12 months and 5,000 hours, within that year, of operating data that use at least 10% less fuel than modern separate heat-and-power generation. 10 to 90% of total net system output must be thermal energy. Criteria-pollutant emissions (NO<sub>x</sub>, SO<sub>2</sub>, etc.), evaluated on an output basis, will be a secondary factor in determining award winners.

A **CHP Certificate of Recognition** recognizes efficient energy conversion projects demonstrating leadership in environmental performance although not achieving the strict award criteria. Projects that demonstrate new technologies, fuel diversity, innovative designs, or otherwise advance new markets for clean CHP are candidates for the certificate. Projects lacking one year of operating data are eligible for a certificate based on design efficiency.

### **Basic Application Information**

1. Facility name and address
2. Contact name and information
3. Total net project efficiency and emissions performance
4. Other environmentally beneficial characteristics
5. Signature of responsible official

### **Process**

An EPA/DOE committee will review all applications. The application deadline for the 1999 ENERGY STAR Award and CHP Certificate of Recognition is February 1, 2000. Multiple awards and certificates may be presented based on the number and type of applications.

### **Recognition**

An award or certificate will be presented to select CHP project participants recognizing their contribution to expanding the development of efficient energy conversion processes. Award winners will be recognized at EPA/DOE's ENERGY STAR Awards Program in March 2000. Additional recognition activities may include highlighting winners on EPA and DOE web sites, with press releases, and in case study materials. Awards may also be presented at industrial and/or association proceedings.

## Example Award Efficiency Criteria Assessment

For purposes of the ENERGY STAR CHP Award evaluation process, CHP project efficiencies will be compared to highly efficient separate power-and-heat generation (an onsite boiler and grid electricity). Comparisons will be performed assuming a natural gas combined cycle electric-only plant operating at a heat rate of 7,000 Btu/kWh (49% efficient) and an 85% efficient boiler. To be eligible for consideration, the CHP project must use at least 10% less fuel at the same power-to-heat (P/H) ratio.

Assume, for example, a 10 MW and 100,000 lb. steam/h (29.3 MW<sub>thermal</sub>) CHP system (P/H = 0.34).

Separate power-and-heat fuel calculation:

Fuel to generate electricity

$$(10,000 \text{ kW}) \times (7,000 \text{ Btu/kWh}) = 70 \text{ mmBtu/h}$$

Fuel to generate steam:

$$(100,000 \text{ lb. steam/h}) \times (1 \text{ mmBtu/1,000 lb. steam}) / 85\% = 118 \text{ mmBtu/h}$$

Total fuel used = 188 mmBtu/h

CHP minimum efficiency award calculation: (less 10% fuel)

$$\text{Fuel input} = 90\% \times (188 \text{ mmBtu/h}) = 169 \text{ mmBtu/h} = 49.5 \text{ MW}$$

$$\text{Power output} = 10 \text{ MW}_{\text{electric}} + 29.3 \text{ MW}_{\text{thermal}} = 39.3 \text{ MW}$$

$$\text{Award-eligible efficiency} = (39.3 \text{ MW}) / (49.5 \text{ MW}) = 79\% \text{ or higher}$$

The above calculation demonstrates that the award eligibility efficiency varies with power-to-heat ratio. The following table shows the minimum award eligibility efficiency at different power-to-heat ratios.

P/H Ratio	Award Eligibility efficiency
0.11	88%
0.25	82%
0.50	76%
1.00	69%
2.00	63%
4.00	59%
9.00	57%

## Additional Information/Application Materials

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If the installation startup date is after December 1, 1998, you are eligible to sign up for the Department of Energy CHP Registry. Contact Pat Hoffman at [patricia.hoffman@hq.doe.gov](mailto:patricia.hoffman@hq.doe.gov).

# ENERGY STAR® CHP Award and Certificate of Recognition Application



All applicants must fill out the information in the space provided.

While not required, supporting documentation of design and operating data will enhance the application.

## General Information

Company/Organization: \_\_\_\_\_

Facility name: \_\_\_\_\_

Facility address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Project startup date: \_\_\_\_\_

Contact name: \_\_\_\_\_

Contact title: \_\_\_\_\_

Contact address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact phone: (\_\_\_\_) \_\_\_\_\_

Contact fax: (\_\_\_\_) \_\_\_\_\_

Contact E-mail: \_\_\_\_\_

## Technology Information

	Design Capacity	Single Year Operating Data <sup>1</sup>
Net power capacity	kW	kWh
Net thermal capacity	mmBtu/h	mmBtu
Heat input (HHV)	mmBtu/h	mmBtu
Total net efficiency (%)		

Annual operating hours: \_\_\_\_\_

% electricity sold to grid: \_\_\_\_\_

<sup>1</sup> Systems with less than one year of operating data are eligible for a certificate based on their total design efficiency and power-to-heat ratio.



